



GENERAL DESCRIPTION

The HC2020 is a synchronous step down regulator from a high voltage input supply. Operating with an input voltage range from 8V to 30V, the HC2020 achieves 3.1A continuous output current with excellent load and line regulation. The switching frequency is fixed to 130 kHz and the synchronous architecture provides for highly efficient designs. Current mode operation provides fast transient response and eases loop stabilization.

The HC2020 requires a minimum number of readily available standard external components. Other features include cable compensation, programmable current limit and thermal shutdown.

The HC2020 converters are available in the industry standard SOP-8L package

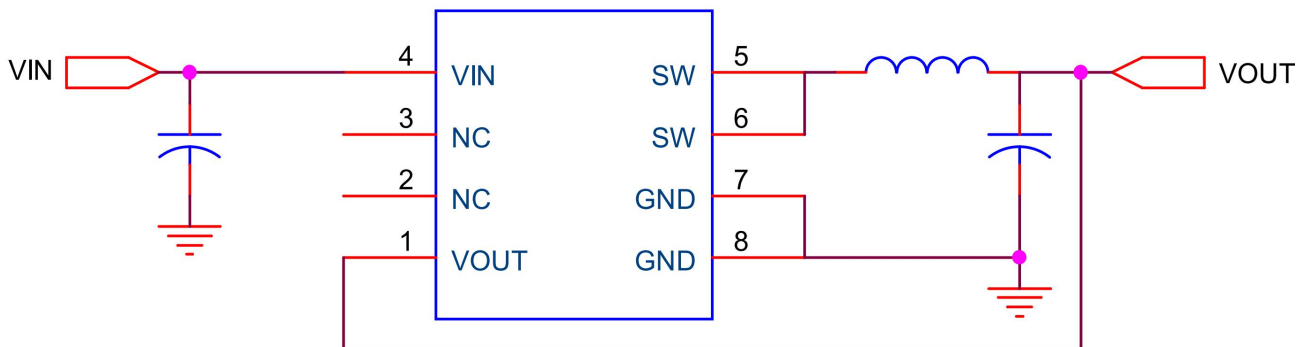
FEATURES

- Wide Input Voltage Range: 8V to 30V
- Up to 93% Efficiency
- Fixed 5.1V Output Voltages
- +/-2% Output Voltage Accuracy
- Fixed switching frequency at 130kHz
- No Loop Compensation Required
- Programmable current limit
- Cable Compensation
- Thermal Shutdown
- Available in SOP-8L Package

APPLICATIONS

- Car Charger / Adaptor
- Pre-Regulator for Linear Regulators
- Distributed Power Systems
- Battery Charger

TYPICAL APPLICATION



PIN CONFIGURATION



恒成微

HC2020

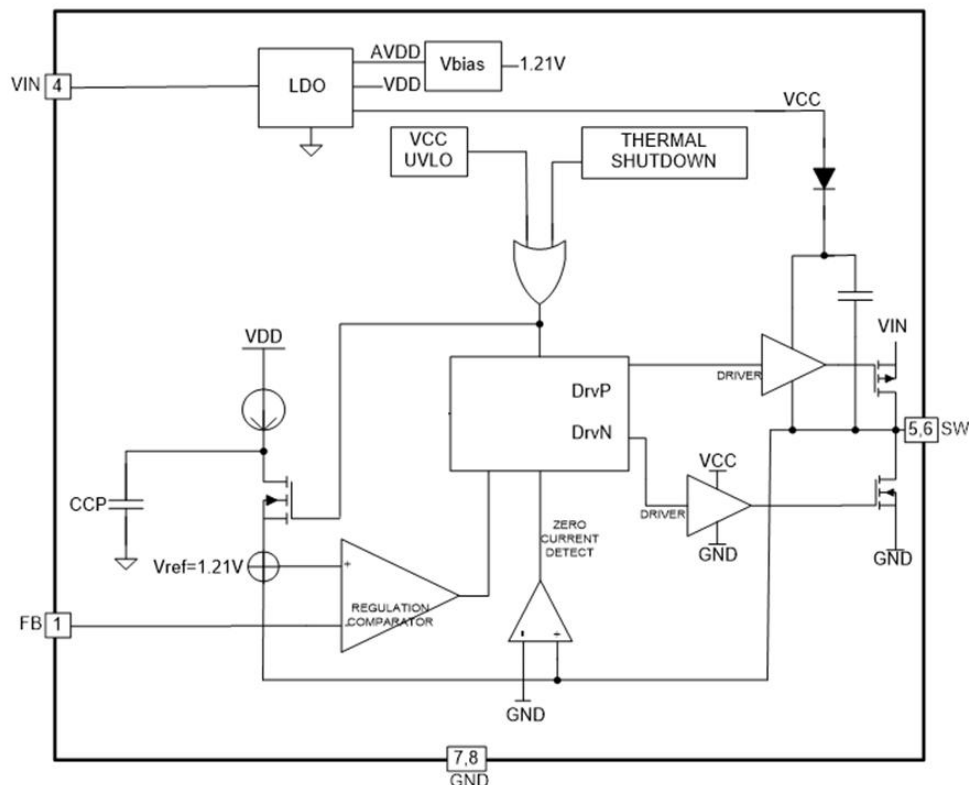
Wide Input Range Synchronous Buck Converter

SOP8	Pin Num	Pin Name	I/O Description
	1	VOUT	Feedback
	2	NC	Not connect
	3	NC	Not connect
	4	VIN	Input Supply Voltage
	5, 6	SW	Switch Node
	7, 8	GND	Ground

ABSOLUTE MAXIMUM RATINGS

VIN, SW Voltage	-0.3V to 33V
VOUT Voltage	-0.3 to 7V
Min/Max Operating Junction Temperature TJ	-40 to 85°C
Min/Max Storage Temperature Tstg	-55 to 150 °C
Lead Temperature(Soldering, 10secs)	260 °C

BLOCK DIAGRAM



ELECTRICAL CHARACTERISTICS

(TA = 25°C, VDD = 12V, if not otherwise noted)



Characteristics	Symbol	Conditions	Min	Typ	Max	Units
Input Voltage	V _{IN}		8	-	30	V
UVLO Voltage	V _{UVLO}		7.5			V
Quiescent Current	I _{CCQ}	V _{OUT} = 5.3V, no switch	-	700	-	uA
Standby Current	I _{SB}	No Load	-	1.7	3	mA
Output feedback	V _{FB}		5.0	5.1	5.2	V
Switching Frequency	F _{SW}			130		KHz
Maximum Duty Cycle				100	-	%
Minimum On-Time			-	250	-	ns
Current Limit	I _{LIM}		3.1			A
VOUT short protect	V _{SCP}			3		V
Hicup Interval	Thiccup			500		mS
RDS _{ON} Of Power MOS	High side	Temp=25℃			55	mΩ
	Low side	Temp=25℃			26	mΩ
Thermal Regulation	T _{TR}			150		℃
Thermal shutdown Temp	T _{SD}		-	160	-	℃
Thermal Shutdown Hysteresis	T _{SH}		-	30	-	℃

**OPERATION DESCRIPTION****General Description**

The HC2020 operates by a constant frequency, current mode architecture. The output voltage is set to fixed 5.1V. An error amplifier compares the internal divided output voltage with the internal reference voltage and adjusts the peak inductor current accordingly.

During normal operation, the internal P-channel MOSFET is turned on each cycle when the oscillator sets the RS latch, and turned off when the current comparator, resets the RS latch. While the P-channel MOSFET is off, the N-channel MOSFET is turned on until either the inductor current starts to reverse, as indicated by the current reversal comparator or the beginning of the next clock cycle.

Current Limit

Current limit detection occurs during the on-time by monitoring the current through the high-side P-MOSFET. The current limit value is defined by internal. If during the on-time the current in the high-side P-MOSFET exceeds the defined current limit value, the next on-time cycle is immediately terminated. Current sensing is achieved by comparing the voltage across the high-side FET

Setting Output Voltage

The output voltage is set by internal resistor divider, so the output voltage is fixed to 5.1V

Output Cable Resistance Compensation

To compensate for resistive voltage drop across the charger's output cable, the HC2020 integrates a simple, cable voltage drop compensation using the impedance at the internal FB pin. 120mV VOUT voltage may rise at 3.1A output load

Thermal Protection

The total power dissipation in HC2020 is limited by a thermal protection circuit. When the device temperature rises to approximately 160°C, this circuit turns off the output, allowing the IC to cool. The thermal protection circuit can protect the device from being damaged by overheating in the event of fault conditions. Continuously running the HC2020 into thermal shutdown degrades device reliability



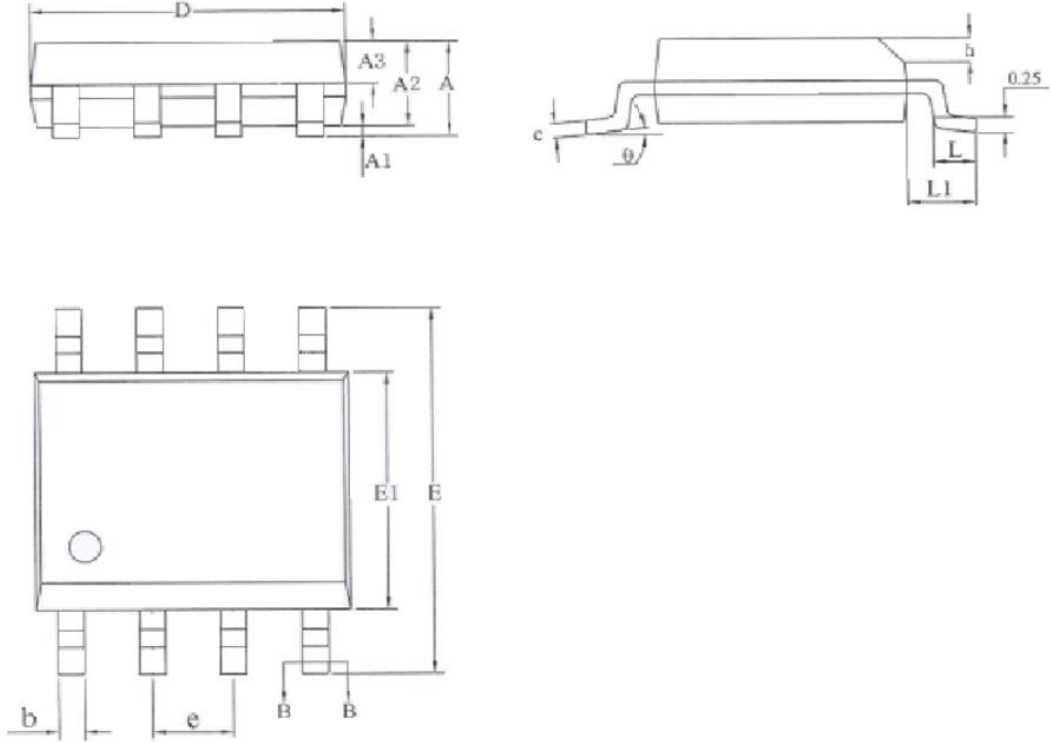
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HC2020

Wide Input Range Synchronous Buck Converter

PACKAGE INFORMATION

SOP8 (unit: mm)



SYMBOL	MILLIMETER			SYMBOL	MILLIMETER		
	MIN	NOM	MAX		MIN	NOM	MAX
A	—	—	1.75	D	4.70	4.90	5.10
A1	0.05	—	0.15	E	5.80	6.00	6.20
A2	1.30	1.40	1.50	E1	3.70	3.90	4.10
A3	0.60	0.65	0.70	e	1.27BSC		
b	0.39	—	0.48	h	0.25	—	0.50
b1	0.38	0.41	0.43	L	0.50	—	0.80
c	0.21	—	0.26	L1	1.05BSC		
c1	0.19	0.20	0.21	θ	0	—	8°